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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/455,991 | 12/06/1999 | HISASHI OHTANI | 07977/213002 | 5835 |
| 26171 | 7590 | 02/10/2004 | EXAMINER | |
| FISH & RICHARDSON P.C. 1425 K STREET, N.W. 11TH FLOOR WASHINGTON, DC 20005-3500 | | | DIAZ, JOSE R | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2815 | |

DATE MAILED: 02/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/455,991

Applicant(s)

OHTANI ET AL.

Examiner

José R Díaz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-12, 14-16, 18, 20, 21 and 23-71 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-12, 14-16, 18, 20, 21 and 23-71 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☒ Certified copies of the priority documents have been received in Application No. 08/998964.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 6-12, 14-16, 18, 20-21, and 23-71 are still rejected under 35 U.S.C. 103(a) as being unpatentable over (specifically "Description of the Related Art" on pages 1-4 of the specification) in view of Zhang et al. (US Pat. No. 5,529,937), previously cited on Paper No. 3.

Regarding claims 6, 9, 23, 31, 39, 55, and 63, Applicant acknowledges a well-known method comprising the steps of: forming an amorphous semiconductor film (see page 1, lines 24-26) on a substrate (see page 1, lines 11-13); providing a metal element (811, 812) capable of promoting crystallization of the amorphous

semiconductor film to form a first metal element added region (811) and a second metal element added region (812) (see fig. 8, below); crystallizing the amorphous semiconductor film so that a crystal growth (822, 823) proceeds in a crystal growth direction parallel to the insulating surface to form first and second crystalline portion (see regions A and B between the metal element 811 and 812 in Fig. 8, below); patterning the crystalline semiconductor film to form at least one crystalline island or active region (803) using only the first crystalline portion (see region A between the metal element 811 and 812 in Fig. 8, below); wherein the first metal element added region (811) is away from the second metal element added region (812); wherein carrier move in the crystalline semiconductor island (803) in a carrier moving direction identical with the crystal growth direction (822, 823) (see page 4, lines 9-11 and fig. 8, below); wherein the second metal element added region (812) is located apart from the crystalline semiconductor island (803) by a distance (E) (see Fig. 8, below); wherein the first metal element added region (811) has a length extending longer from an end portion of the crystalline semiconductor island (803) in a longitudinal direction of the first metal element added region (consider the portion of the metal element (811) that is between the end side of the region (B) and the end side of the crystalline semiconductor island (803) in Fig. 8, below).

However, applicant in the "Description of the Related Art" is silent with respect to the limitation of forming the amorphous semiconductor film on an insulating surface. Zhang et al. teaches that it is well known in the art to form an amorphous layer (104) over an insulating layer (102) (see fig. 1b). Applicant and Zhang et al. are analogous art

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because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the amorphous layer over an insulating surface. The motivation for doing so, as is taught by Zhang et al., is to provide a protective film over the substrate (col. 8, lines 24-26). Therefore, it would have been obvious to combine applicant with Zhang et al. to obtain the invention of claims 6-12, 14-16, 18, 20-21, and 23-71.

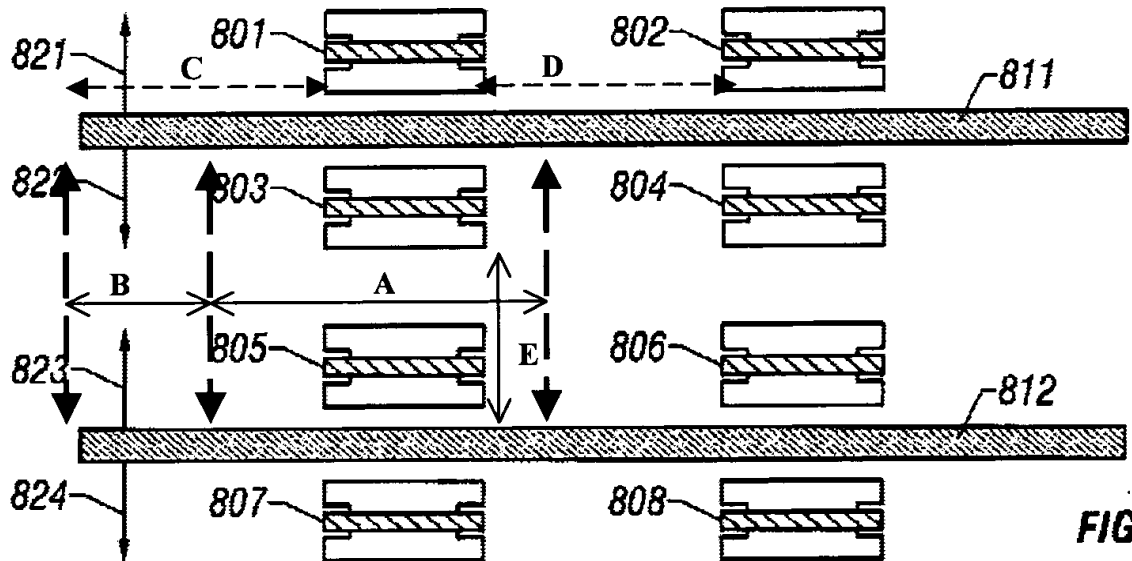


FIG. 8
(Prior Art)

Regarding claims 8, 10, 25, 33, 41, 49, 57 and 65, Applicant acknowledges that the metal element comprises at least Ni (811, 812) (see page 3, line 21 of specification).

Regarding claims 11-12, 26-27, 34-35, 42-43, 50-51, 58-59 and 66-67, Zhang et al. teaches that it is well known in the art to introduced the metal element by an ion implantation or by coating a solvent (see col. 11, lines 21-35). The motivation for

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introducing the metal element by ion implantation or by coating a solvent is to introduce a catalyst element, which promotes the crystallization of the amorphous layer (col. 5, lines 58-65).

Regarding claims 14, 18, 28, 36, 44, 52, 60 and 68, applicant acknowledges that the amorphous semiconductor film comprises silicon (see page 3, lines 22-24).

Regarding claims 7, 24, 32, 40, 47-48, 56, 64, and 71, applicant and Zhang et al., as stated before, teaches the claimed method (see rejection of claim 6, above). In addition, applicant acknowledges that the lengths (C, D) of the first metal element added region (811) and the second element added region (812) is about twice the length of 801 or 803 region, see Fig. 8, above). With regards to the limitations of a length of 100 μm or more, and a length of 50% or more of a crystal growth distance, it would have been obvious to one of ordinary skill in the art, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Huang*, 40 USPQ2d 1685,1688(Fed. Cir. 1996) citing *In re Aller*, 105 USPQ 233., 235 (CCPA 1955).

Regarding claims 15-16, 20-21, 29-30, 37-38, 45-46, 53-54, 61-62 and 69-70, Applicant acknowledges that at least one of the transistors (803) formed by the method disclosed in the *Description of the Related Art* "has characteristics suitable for high-speed operation" (see page 4, lines 9-11). With regards to the claimed S value, it would have been obvious to one of ordinary skill in the art, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum

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or working ranges involves only routine skill in the art. *In re Huang*, 40 USPQ2d 1685,1688(Fed. Cir. 1996) citing *In re Aller*, 105 USPQ 233., 235 (CCPA 1955).

Response to Arguments

4. Applicant's arguments filed November 25, 2003 have been fully considered but they are not persuasive.

With regards to the "dummy metal regions", it is noted that nowhere in the claims Applicant recites such "dummy metal regions." As a matter of fact, Applicant only claims the formation of "a first metal element added region" and "a second metal element added region", which both are taught in figure 8 of Applicant's admitted prior art as regions 811 and 812.

With regards to the first and second crystalline portions, Applicant is advised that during patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification" (see MPEP 2111). In the instance case, the term "portion" is interpreted as to be any region formed between the metal element 811 and 812. For example, figure 8, as stated in the Office action mailed September 9, 2003, shows the formation of "a first crystalline portion" (A) and "a second crystalline portion" (B) (please note that both portions A and B are located between the metal elements 811 and 812, and only portion A includes the region in which the at least one crystalline island, i.e. 803, is formed).

With regards to the limitations about the length of 50% or more of a crystal growth distance, and the length of about 100 μm or more, please note that figure 8

discloses that the metal added regions (811, 812) are further extended from an end portion of the crystalline semiconductor islands (803-806), which appear to have the same length dimension than the extended portion of the "dummy metal regions" 701/702 of figure 7. Thus, the claimed length range is merely an optimization of the teaching provided by figure 8. Therefore, it would have been obvious to one of ordinary skill in the art, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Huang*, 40 USPQ2d 1685,1688(Fed. Cir. 1996) citing *In re Aller*, 105 USPQ 233., 235 (CCPA 1955).

Accordingly, the rejection under 35 USC § 103 is considered to be proper.

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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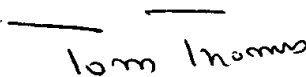
Correspondence

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078 or (571) 272-1727, after February 9, 2004. The examiner can normally be reached on 9:00-5:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD


Tom Thomas
Supervisory Patent Examiner
Technology Center 2800